GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Linear Algebra and Calculus II (I700267)

Course size *(nominal values; actual values may depend on programme)*

Credits 5.0 **Study time 150 h**

Course offerings and teaching methods in academic year 2026-2027

A (semester 2)	Dutch	Gent	independent work	0.0h
			seminar	
			lecture	

Lecturers in academic year 2026-2027

Schelfaut, An	LA26	staff member
Baetens, Jan	LA26	lecturer-in-charge
Mattheijssens, Joris	LA26	co-lecturer

Offered in the following programmes in 2026-2027	**crdts**	**offering**
Bachelor of Science in Bioscience Engineering Technology	5	A
Linking Course Master of Science in Bioscience Engineering Technology: Agriculture and Horticulture (main subject Horticulture)	5	A
Linking Course Master of Science in Bioscience Engineering Technology: Agriculture and Horticulture (main subject Plant and Animal Production)	5	A
Linking Course Master of Science in Biochemical Engineering Technology	5	A
Linking Course Master of Science in Bioscience Engineering Technology: Food Industry	5	A

Teaching languages

Dutch

Keywords

linear systems, matrices, determinants, complex numbers, eigenvalues, eigenvectors, functions of several variables, multiple integrals, vector fiels, line integrals, Python

Position of the course

To teach students the most essential mathematical techniques, methods and skills, starting from a clearly defined level of foreknowledge. In this way students should be able to explore problems in their study field with a certain degree of exactness and to understand, to analyse and describe the different biological systems and production processes. A solid mathematical background needed in almost all engineering disciplines is surely based on a number of algebraic and analytic techniques (see table of contents). It is important that the students learn how to reason in a critical, logical, deductive and analytical way, without losing their sense for generality and abstraction. The subject matter of this course stimulates students to synthesize, plan and to work independently, essential qualities in the context of long-life learning. Various examples and exercises illustrate the theory. The proofs are restricted to a necessary minimum.

Contents

Linear algebra:
- Systems of linear equations
- Vector and matrix equations
- Linear transformations
- Matrix calculus
- Subspaces
- Determinants

- Eigenvalues and eigenvectors
- Diagonalization of matrices
- Complex numbers
- Complex eigenvalues

Calculus II:

- Vector-valued functions
- Functions of several variables
- Double and line integrals

Initial competences

Advice: having followed the course Calculus I.

Final competences

1 Have insight into the mathematical, geometric and physical meaning of matrices, determinants, eigenvectors, eigenvalues, vector-valued functions, functions of several variables, double and line integrals.
2 Use matrices, determinants, eigenvectors, eigenvalues, vector-valued functions, functions of several variables, double and line integrals.
3 Follow a reasoning regarding linear algebra and functions of several variables and act accordingly.
4 Being able to analyze the correctness of logical reasonings.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture, Independent work

Extra information on the teaching methods

During the lectures the concepts are introduced and made clearer by examples and applications.
During the coached exercises the students are further trained using standard and similar exercises.

Study material

Type: Syllabus

Name: Linear algebra and Calculus II - partim Linear algebra
Indicative price: € 10
Optional: no
Language : Dutch
Oldest Usable Edition : 2023-2024
Available on Ufora : Yes
Online Available : No
Available in the Library : Yes
Available through Student Association : Yes

References

David Lay. Linear Algebra and its applications, 5th edition.
Hartman, G., Siemers, T., Heinold, B., Chalishajar, D., Bowen, J., APEX Calculus;
R. Adams and C. Essex, Calculus, a complete course

Course content-related study coaching

The lecturer answers questions related to the theory by appointment or before/after the lectures, the teaching assistants answer questions regarding the exercises and there is support through Ufora.

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

First and second exam session: written, closed-book examination.

Calculation of the examination mark

The weighting coefficients that are used to calculate the final score for this course are as follows:
Algebra: 1/2
Calculus II: 1/2
Students who eschew period aligned evaluation for this course unit may be failed by the examiner.